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Primary and secondary control in academic development: gender-specific implications for stress and health in college students

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Abstract
During the first year of college, students are faced with numerous educational and personal stressors which can negatively impact their psychological and physical health. The present study examined the benefits of primary and secondary control for self-rated health in students based on Rothbaum, Weisz, and Synder's (1982) dual-process model of control, and examined stress and gender as potential mediating variables. College students' ($n = 888$) primary and secondary academic control and perceived stress were assessed in the first semester, and self-rated global health, illness symptoms, and illness-related behaviors were assessed at the end of the academic year. For males, primary control was indirectly related to better overall health and fewer symptoms through lower stress levels, and both primary and secondary control directly corresponded to lower illness behaviors. For females, only secondary control was related to better overall health and illness symptoms, albeit indirectly through reduced stress. The mediational roles of stress and gender in health research on primary/secondary control and potential control-enhancing interventions are discussed.

Keywords: *Primary and secondary control, college student health, stress, gender*

The college classroom presents various challenges that can negatively impact students' psychological and physical well-being. During the first year in particular, students are faced with numerous educational and personal stressors that can negatively impact their health and well-being (see Hudd et al., 2000; Lumley & Provenzano, 2003; Perry, 1991, 2003). Research on student health indicates that many college students must overcome challenges not only in the classroom but involving family, sexuality, autonomy, and illness, with each of these factors potentially contributing to poorer self-rated health status in these individuals (Damush, Hays, & DiMatteo, 1997). College norms endorsing risk-taking behaviors involving poor sleep patterns (Buboltz, Brown, & Soper, 2001), binge drinking (Vaez & Laflamme, 2003), and unsafe sexual practices (Larouche, 1998) may also predispose students to unhealthy lifestyle patterns and serious future health problems (e.g., heart disease; Spencer, 2002).

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Despite the perception that college-aged individuals are relatively free of health problems, college students have been shown to experience medical and psychological difficulties similar to those found in the general population (Oprendek & Malcarne, 1997; Rosenthal & Schreiner, 2000), and do not typically rate their health more favorably than older adults (Fayers, 2002; Svenson & Campbell, 1992; Vingilis, Wade, & Adlaf, 1998). Health research on undergraduates in Canada (Adlaf, Gliksman, Demers, & Newton-Taylor, 2001) and Britain (Roberts, Golding, Towell, & Weinreb, 1999) further suggests that college students may in fact report *poorer* psychological health than their non-academic counterparts because of the challenging transition from high school to college. However, due to the often time-urgent and potentially life-threatening nature of health problems experienced by older adults, research concerning the relationship between stress-related psychosocial constructs, such as personal control (Lazarus & Folkman, 1984), and self-rated health has largely focused on older populations (e.g., Chipperfield, Perry, & Menec, 1999; Menec & Chipperfield, 1997; Menec, Chipperfield, & Perry, 1999). The aim of the present study was to examine the health benefits of perceived control in college students based on Rothbaum et al.'s (1982) dual-process model, as well as the roles of perceived stress and gender in mediating the effects of primary and secondary control on self-rated health in these individuals.

Primary and secondary control

Research in academic achievement settings has repeatedly confirmed the importance of perceived control (Perry & Dickens, 1984; Perry, Hladkyj, Pekrun, & Pelletier, 2001; Perry & Magnusson, 1989; Perry, Schonwetter, Magnusson, & Struthers, 1994), a construct that, until recently, was based in part on the premise of the perceived ability to influence one's academic environment (for review see Perry, 1991). However, Rothbaum et al. (1982) theorize that some behaviors ordinarily understood as reflecting a loss of control or helplessness, may in fact serve to maintain perceptions of personal control. Likewise, these authors have proposed a dual-process model in which perceived control is sustained by attempts to either change the environment (primary control) or to psychologically adjust to one's environment (secondary control). According to other researchers studying primary and secondary control from related, but somewhat different theoretical approaches, primary-control strategies typically consist of goal-directed persistence and effort, whereas secondary-control strategies may involve a variety of techniques, including the downgrading of expectations or task importance, accepting limitations, or perceiving benefits from an otherwise adverse experience (Chipperfield & Perry, 2006; Heckhausen & Schulz, 1995).

Recent research on primary and secondary control from both the educational and coping domains suggests that active rather than more passive secondary-control beliefs and strategies (e.g., positive reinterpretation vs. disengagement, respectively) are most effective in fostering the social and academic development of adolescents and college students (Hall, Perry, Ruthig, Hladkyj, & Chipperfield, 2006; Halliday & Graham, 2000; Petito & Cummins, 2000; Wadsworth & Compas, 2002). This is consistent with Heckhausen and Schulz (1995), who note that secondary-control strategies of a compensatory nature, such as positive reappraisal, are self-protective, allowing individuals to sustain their motivation in situations affording opportunities for future success (e.g., achievement settings). Thus, as optimal adaptation to failure requires engaging in control processes "in accordance with the structure of opportunities and constraints encountered in a given developmental ecology" (Heckhausen & Schulz, 1998, p. 57), primary-control strategies, such as persistence, and

secondary-control techniques involving positive reinterpretation seem to be most beneficial for students by allowing them to capitalize on the various opportunities for academic, social, and physical development available during young adulthood.[1]

Health psychology research has demonstrated the beneficial nature of secondary-control beliefs and strategies for individuals faced with serious health problems. For instance, secondary control has been shown to be effective for children dealing with recurrent pain (Thomsen et al., 2002), cancer (Weisz, McCabe, & Dennig, 1994), and diabetes (Band & Weisz, 1990). This literature has also examined the health benefits of these control processes for middle-age and older adults coping with serious health conditions such as HIV (Thompson, Nanni, & Levine, 1994), cancer (Carver et al., 1993; Thompson, Sobolew-Shubin, Galbraith, Schwankovsky, & Cruzen, 1993), heart disease (Affleck, Tennen, Croog, & Levine, 1987; Taylor, Helgeson, Reed, & Skokan, 1991), heart attacks and strokes (Chipperfield, Perry, Bailis, & Chuchmach, 2006), as well as chronic health problems (Chipperfield et al., 1999). Although some research has addressed the health implications of primary and secondary control for younger adults with health-related difficulties (aged 20–35 years; Wrosch, Heckhausen, & Lachman, 2000), and the impact of general perceptions of control (illness onset/offset; Oprendek & Malcarne, 1997), locus of control (Steptoe & Wardle, 2001), and attributional style (Bennett & Elliott, 2002; Hemenover & Dienstbier, 1998) on college student health, little research has applied Rothbaum et al.'s (1982) dual-process model to the study of health in young adults making the transition to the challenges of college life.

Gender, stress, and self-rated health in college students

Much of the existing research on self-rated health in college student populations has addressed gender differences, which overall has yielded an intriguing yet consistent pattern of results. Specifically, this research suggests that female students report greater levels of stress (Adlaf et al., 2001; Hudd et al., 2000) and more health problems than their male counterparts (Shifren & Bauserman, 1996; Vaez & Laflamme, 2003; Vingilis et al., 1998; Wade, Pevalin, & Vingilis, 2000), despite reporting more health-promoting lifestyles than male students (Larouche, 1998; Vaez & Laflamme, 2003; for similar findings in non-academic adult samples see Denton, Prus, & Walters, 2004, and Gijsbers van Wijk, Huisman, & Kolk, 1999). According to this body of research, these gender differences on *self-report* measures of health and illness appear to be due to discrepant interpretations of illness symptoms between the sexes, with females largely considered to have a more differentiated view of illness as well as a lower threshold for symptom perception than males (Gijsbers van Wijk et al., 1999; Green, 1990). It has also been suggested that overly positive self-reported health status in male students may be motivated by masculine norms of invulnerability, independence, and insensitivity, with health being of concern primarily in terms of physical appearance (Baffi, Radican, Sefchick, & Impara, 1991; Davies et al., 2000). As a result, male college students may often be either unaware or unconcerned about their health problems, and consequently, less knowledgeable about illness detection or health care services than their female counterparts (Davies et al., 2000).

In addition to gender differences, perceived stress has also been an important topic of ongoing research on self-rated health in college students. During the first year of college, students are faced with numerous *educational* challenges in the process of adjusting to this novel and often stressful academic setting, including increased pressure to succeed at unfamiliar tasks, greater academic competition, more frequent failure experiences, and

important career decisions (Perry, 1991, 2003). The transition from high school to college is also accompanied by various *personal* challenges of a stressful nature, such as changes in interpersonal relationships, living arrangements, and personal finances, all of which may predispose students to health difficulties (Lumley & Provenzano, 2003; Perry et al., 2001). Previous research on self-rated health in college students has repeatedly illustrated the deleterious effects of educational and personal stressors on perceived physical well-being (Bernard & Belinsky, 1993; Damush et al., 1997; Edwards, Herschberger, Russell, & Markert, 2001; Hudd et al., 2000; Robbins, Spence, & Clark, 1991; for reviews of research on stress, coping, and health in school-aged students see Boekaerts, 1996, and Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001).

Primary/secondary control research

Recent research on primary and secondary control suggests that both perceived stress and gender play an important role in mediating the effectiveness of these control processes on physical and psychological well-being. Perceived control research over the past 20 years has found that the health benefits of perceived personal control are largely mediated by its impact on perceptions of stress (Lazarus & Folkman, 1984; for reviews see Smith & Lazarus, 1990, and Avison & Cairney, 2003). With regard to Rothbaum et al.'s (1982) dual-process model, Thompson (2002) suggests that individuals having high levels of both primary and secondary control are better able to "protect themselves against the potentially health-compromising physiological effects of stress" (p. 204). Recent research on college students provides empirical support for this premise. For example, Connor-Smith and Compas (2002) examined how first-year college students with a heightened sensitivity to social disapproval use both primary and secondary control forms of coping to deal with the stress of developing peer relationships. This study showed that both primary-control (i.e., generating social support) and secondary-control (e.g., reinterpretation) strategies concerning interpersonal difficulties corresponded with lower levels of anxiety for socially anxious students.

Previous research on successful adaptation in older adulthood also illustrates the importance of considering gender differences when assessing the health implications of primary and secondary control. Findings from work by Chipperfield and colleagues highlight the importance of assessing gender differences in control-striving behavior, showing that while males relied more on primary- than secondary-control strategies, females were more likely to emphasize both types of control strategies (Chipperfield et al., 1999) and to show greater diversity in their use of secondary-control strategies (Chipperfield et al., 2006). Of more relevance to the present study was the finding that, among women, secondary-control strategies appeared to have a salutary effect: the more frequent use of compensatory secondary-control strategies corresponded to fewer hospital admissions and shorter durations for hospital stays in the subsequent 2 years (Chipperfield & Perry, 2006). In contrast, for men, more frequent use of proactive, primary-control strategies related to fewer hospitalizations. Thus, although previous research on primary and secondary control has examined the link between these control processes and stress in students, and the relationship between control strategies, gender, and health outcomes in older adults, little research has examined the implications of Rothbaum et al.'s (1982) dual-process model for college student health as mediated by gender differences and perceptions of stress.

The present longitudinal study used structural equation modeling to examine the self-rated health of freshman students making the transition from high school to college from

the perspective of Rothbaum et al.'s (1982) dual-process model of control. Specifically, this study explored how primary control (i.e., effort, persistence) and secondary control (i.e., positive reinterpretation) in first-year students influenced their self-reported health status, illness symptoms, and illness-related behaviors (i.e., missed classes, doctor visits) during this important educational transition phase. Consistent with previous research on self-rated health in college students (Adlaf et al., 2001; Hudd et al., 2000; Shifren & Bauserman, 1996; Vaez & Laflamme, 2003; Vingilis et al., 1998; Wade et al., 2000) and primary/secondary control (Chipperfield et al., 1999, 2006; Chipperfield & Perry, 2006), the present analyses were conducted for males and females separately. Further, based on recent research on stress and perceived health in college students (Bennett & Elliott, 2002; Hemenover & Dienstbier, 1998; see Lazarus & Folkman, 1984), and the stress-reducing nature of primary control (Taylor et al., 1991; Thompson, Collins, Newcomb & Hunt, 1996) and secondary control (Langrock, Compas, Keller, Merchant, & Copeland, 2002; Thomsen et al., 2002; Wadsworth & Compas, 2002), perceived stress was also examined as a potential mediator between students' perceptions of control and their self-reported health status.[2]

Method

Participants

Two months into the academic year, 888 students at a large, mid-western, research 1 university volunteered to participate in a two-part study in exchange for experimental credit. Participants were recruited from ten sections of a two-semester introductory psychology course and were required to complete a multi-part questionnaire concerning their university experiences at the beginning (Time 1) and at the end (Time 2) of the academic year. The Time 1 sample consisted of 575 females and 278 males (35 students did not indicate their gender), with most between the ages of 17 and 24 years (93%). The Time 2 sample was reduced by 31% (final $n = 609$) for various reasons, including students having already completed their experimental credit requirements, having withdrawn from the course, etc. Study attrition analyses on students who completed the introductory psychology course revealed that a greater proportion of males than females withdrew from the study (36% vs. 20% respectively; $\chi^2(1, 1) = 19.61$, $p < 0.001$) and that dropouts had lower initial course performance than those who completed the study (62% vs. 67% respectively; $t(466) = 3.58$, $p < 0.001$). It should be noted, however, that this difference in performance was relatively small (5%) and the resulting gender ratio (71% female) resembles that found in recent research by this laboratory (e.g., 69% female: Hall, Perry, Chipperfield, Clifton, & Haynes, 2006; 73% female: Ruthig, Perry, Hall, & Hladkyj, 2004). This larger representation of females in our study also corresponds to developing trends in North American post-secondary institutions (Sokoloff, 2004). No attrition effects were found with regard to age, primary and secondary control, or perceived stress.

Independent variables

Primary academic control (PC). A ten-item measure assessing primary academic control beliefs based on Perry et al.'s (2001) Academic Control Scale was employed in which students indicated on a five-point Likert scale the extent to which they agreed with statements such as "I have a great deal of control over my academic performance in my psychology course," and "The more effort I put into my courses, the better I do in them"

(1 = strongly disagree, 5 = strongly agree; Cronbach's $\alpha = 0.81$). A 5-month test–retest reliability estimate revealed acceptable stability between Times 1 and 2, $r(571) = 0.64$, $p < 0.001$. Although the academic primary-control measure was negatively skewed (skewness = −1.24), this is consistent with recent research on academic control (e.g., Perry et al., 2001) and is attributed to truly low-PC individuals being less likely to enter college (Perry, 1991; Rotter, 1975; Stipek & Weisz, 1981).

Secondary academic control (SC). Interpretive secondary academic control beliefs and strategies were assessed using a four-item, five-point Likert-style measure derived from Hladkyj Pelletier, Drewniak, and Perry's (1998) Secondary Academic Control Scale (see Appendix) and included statements such as "No matter how well I do on a test or in a course, I try to 'see beyond' my grades to how my experience at university helps me to learn about myself," and "Whenever I have a bad experience at university, I try to see how I can 'turn it around' and benefit from it" (1 = strongly disagree, 5 = strongly agree; Cronbach's $\alpha = 0.64$). The interpretive form of secondary control was selected based on recent research suggesting that interpretive control is of greater benefit to young adults and adolescents than other forms of secondary control outlined by Rothbaum et al.[3] (1982; Hall, Perry, Ruthig, et al., 2006), as well as more passive secondary-control strategies such as acceptance or cognitive disengagement (Halliday & Graham, 2000; Petito & Cummins, 2000; Wadsworth & Compas, 2002). A 5-month test–retest reliability estimate indicated acceptable stability between Times 1 and 2, $r(579) = 0.55$, $p < 0.001$.

Perceived stress. A six-item measure based on Cohen, Kamarck, and Mermelstein (1983) was used to assess general perceptions of stress (1 = never, 5 = often; Cronbach's $\alpha = 0.85$), for example, how often they had "felt nervous and 'stressed'" or were unable to cope with events in their daily lives. This measure assesses students' overall perceptions of stress which, consistent with appraisal theory (Lazarus & Folkman, 1984), have been shown to mediate between perceived controllability and health outcomes in college students (e.g., Hemenover & Dienstbier, 1998; for reviews see Smith & Lazarus, 1990, and Avison & Cairney, 2003). Although academic stressors (e.g., poor grades) have been found to best predict psychological symptoms of stress in students between the ages of 18 and 20 years (Compas, Phares, & Ledoux, 1989), the present scale is more general in nature so as to capture students' perceived stress resulting from both educational and personal challenges.

Academic performance. To control for the influence of students' academic achievement on their self-rated health, students' average percent performance on three introductory psychology course examinations administered during the first academic term was obtained from course instructors for consenting students and was included as a background variable in the structural equation modeling analyses (mean = 65.32%, SD = 13.29%, range = 23.67–96.67%).

Dependent variables

Global health status. Students' overall self-reported health status was assessed using a five-point, Likert-style measure, summing two items asking students to rate their physical and psychological health at that moment (1 = very poor, 5 = very good; mean = 7.10, SD = 1.57; inter-item $r = 0.43$, $p < 0.001$).

Illness symptoms. An eight-item symptom checklist derived from the Cohen–Hoberman Inventory of Physical Symptoms (CHIPS; Cohen & Hoberman, 1983) asked students to indicate the extent to which they were bothered by various common illness symptoms per month over the past 3 months using the following scale: 1 = not at all, 2 = about once a month, 3 = about twice a month, 4 = about 4 times a month, 5 = 5 or more times a month (Cronbach's $\alpha = 0.80$). Symptoms included self-reported headaches, sleep problems, low energy, fatigue, muscle tension, stomach pain, heart pounding, and poor appetite.

Illness-related behaviors. Behavioral indicators of poor health consisted of two items, asking students to indicate how often they had missed classes or visited a physician due to illness using the same five-point Likert scale as in the previous measure (mean = 3.08, SD = 1.26). Because these items were significantly and positively skewed (skewness = 1.72 and 1.67, respectively), each was dichotomized prior to being summed to distinguish between those reporting none versus one or more illness-related behaviors.

Procedure

The Time 1 (October) questionnaire was administered in a classroom setting 1 month into the academic year to ensure that all students would have received feedback on one test in at least one course, giving them a basis upon which to respond to the questionnaire. Students selected a session time and day to complete the initial Time 1 questionnaire, which included the measures of primary and secondary control and perceived stress. Near the end of the academic year, students completed a second questionnaire at Time 2 (March), which included the self-report health measures. Introductory psychology test scores were obtained from course instructors for consenting students at the end of the academic year.

Results

Preliminary analyses

Gender differences. Means and standard deviations by gender, as well as t test and effect size values, are presented in Table I. Consistent with previous research showing gender differences in college students' academic achievement (Ethington & Smart, 1986; Isaac, Malaney, & Karras, 1992), female students outperformed their male counterparts with regard to first-semester course performance (mean = 66.57% and 63.70%, respectively);

Table I. Means and standard deviations by gender.

	Males			Females				
Variable	*n*	Mean	SD	*n*	Mean	SD	*t*	η_p^2
Primary control[a]	275	41.54	5.45	559	41.85	5.35	0.77	.00
Secondary control[a]	274	13.43	2.59	570	13.35	2.88	0.37	.00
Perceived stress[a]	277	17.73	4.62	567	19.52	4.73	5.22**	.03
Global health[b]	170	7.35	1.54	411	6.99	1.58	2.53*	.01
Illness symptoms[b]	169	20.51	6.05	406	24.29	6.97	6.50**	.06
Illness behaviors[b]	169	2.60	0.70	409	2.89	0.77	4.34**	.03
Academic performance[c]	160	63.70	12.70	305	66.57	13.44	2.23*	.01

Note. *$p < 0.05$; **$p < 0.01$. [a]Time 1 measure; [b]Time 2 measure; [c]Obtained upon completion of the course.

$t(463) = 2.23$, $p < 0.05$. Although gender differences were not found on primary and secondary control, female students reported greater perceived stress, $t(842) = 5.22$, $p < 0.001$; poorer overall health, $t(579) = 2.53$, $p < 0.05$; more illness symptoms, $t(573) = 6.50$, $p < 0.001$; and more illness-related behaviors than male students, $t(576) = 4.34$, $p < 0.001$. This is consistent with prior research on self-rated health in college students showing that females report greater stress (Adlaf et al., 2001; Hudd et al., 2000) and poorer health than males (Green, 1990; Shifren & Bauserman, 1996; Vaez & Laflamme, 2003; Vingilis et al., 1998; Wade et al., 2000), and that males are more likely to exaggerate their positive health status and less inclined to notice and/or report health problems (Baffi et al., 1991; Davies et al., 2000).

Correlations. Consistent with the main structural equation modeling analyses presented below, correlational analyses were conducted for male and female students separately (see Table II). Correlations were similar in both genders for primary control, which was positively related to global health and academic performance and negatively correlated with perceived stress. Primary control was also found to correlate negatively with illness-related behaviors for males (not significant for females) and correlate positively with secondary control for females (not significant for males). Secondary control did not correlate significantly with any self-report variable for males, but for females was significantly related to lower perceived stress and better global health. The health measures were similarly interrelated for both genders; however, global health and illness behaviors were significantly and negatively correlated for females. Significant negative correlations involving academic performance were found only for female students, with secondary control, perceived stress, and illness behaviors all corresponding with poorer performance levels.

These correlations are consistent with previous research in achievement motivation demonstrating the positive relationship between primary-control beliefs and academic performance (e.g., Perry & Dickens, 1984; Perry & Magnusson, 1989; Perry et al., 1994, 2001), and are also consistent with Rothbaum et al. (1982), who stated that performance outcomes are "most fostered by primary control and most jeopardized by secondary control" (p. 29). This pattern of correlations also aligns with existing research showing that, although females tend to use both primary and secondary control, males are more likely to rely on primary control alone (Chipperfield et al., 1999). Finally, the weak correlations between primary and secondary control for both males, $r(271) = 0.11$, $p = 0.07$, and females, $r(555) = 0.22$, $p < 0.001$, are consistent with previous research on these constructs

Table II. Zero-order correlations among study variables for males (top right) and females (bottom left).

Variable	1	2	3	4	5	6	7
1. Primary control[a]	—	0.11	−0.26*	0.20*	0.01	−0.20*	0.19*
2. Secondary control[a]	0.22*	—	−0.08	0.01	−0.03	−0.10	−0.04
3. Perceived stress[a]	−0.14*	-0.11*	—	−0.35*	0.29*	0.08	0.00
4. Global health[b]	0.11*	0.12*	−0.31*	—	−0.46*	−0.09	0.05
5. Illness symptoms[b]	0.01	−0.09	0.49*	−0.38*	—	0.23*	0.13
6. Illness behaviors[b]	−0.09	0.06	0.10	−0.22*	0.23*	—	−0.10
7. Academic performance[c]	0.21*	−0.18*	−0.14*	0.09	0.02	−0.17*	—
Mean	41.72	13.38	18.91	7.10	23.09	2.81	65.32
SD	5.41	2.78	4.76	1.57	6.94	0.76	13.29

Note. *$p < 0.05$. [a]Time 1 measure; [b]Time 2 measure; [c]Obtained upon completion of the course.

in young adults (Hall, Perry, Ruthig, et al., 2006; Lackovic-Grgin et al., 2001) and adolescents (Petito & Cummins, 2000; Wadsworth & Compas, 2002).

Structural equation modeling analyses

Rationale for analysis. Structural equation modeling using the AMOS program (Arbuckle & Wothke, 1999) was conducted to examine the influence of primary and secondary control on the self-report measures of global health, illness symptoms, and illness-related behaviors. The potential mediating effect of perceived stress was also assessed based on previous research specifically concerning student health, and primary/secondary control more generally. First, research on college students has found feelings of stress to be not only an important predictor of self-reported health status (Bernard & Belinsky, 1993; Cohen et al., 1983; Damush et al., 1997; Hudd et al., 2000; Robbins et al., 1991), but also a key mechanism mediating the relationship between appraisals of controllability and health outcomes (Bennett & Elliott, 2002; Hemenover & Dienstbier, 1998). Second, research on primary and secondary control has repeatedly demonstrated the anxiety-reducing nature of primary control for adults coping with serious health problems (Taylor et al., 1991; Thompson et al., 1993, 1996), and the reduced stress associated with secondary control for children dealing with parental depression (Langrock et al., 2002) and recurrent pain (Thomsen et al., 2002), and for adolescents experiencing financial or familial strain (Wadsworth & Compas, 2002).

In sum, gender-specific structural equation modeling analyses were conducted that included all the direct paths from primary and secondary control to overall health, illness symptoms, and illness behaviors, and the mediated paths from primary and secondary control through perceived stress to the three self-report health measures. Analyses were conducted for females and males separately, consistent with previous health research on college students (e.g., Baffi et al., 1991; Davies et al., 2000; Green, 1990) and primary/secondary control (Chipperfield et al., 2006; Chipperfield & Perry, 2006), as well as the multiple-group analyses presented in the next section. The self-report constructs were assessed as latent variables predicting the aforementioned, respective scale items as manifest variables. Consistent with our preliminary correlational analyses, each model also included correlations between the error terms for the latent primary and secondary control measures and between the error terms for each of the latent health measures. First semester course performance was included as a manifest background variable to control for the positive relationship between academic performance and students' self-reported health status (Vingilis et al., 1998; Wade et al., 2000; see Correlations). Overall goodness of fit was assessed using the chi-square ratio, which divides the chi-square value by the degrees of freedom so as to minimize bias due to sample size and model complexity (acceptable range = 1–3; McIver & Carmines, 1981). Other fit indices assessed included Bentler's comparative fit index (CFI; Bollen & Long, 1993), the Tucker-Lewis Index (TLI), and Browne and Cudeck's (1993) root mean square error of approximation (RMSEA).

Multiple-group analyses. To examine gender as a potential moderator of our analytical model (Figure 1), multiple-group analyses on both the structural and measurement models were conducted. First, a chi-squared difference test was performed to test whether the gender differences model was significantly different from the group invariant model with regard to the main paths between the latent constructs (structural model). Results of this

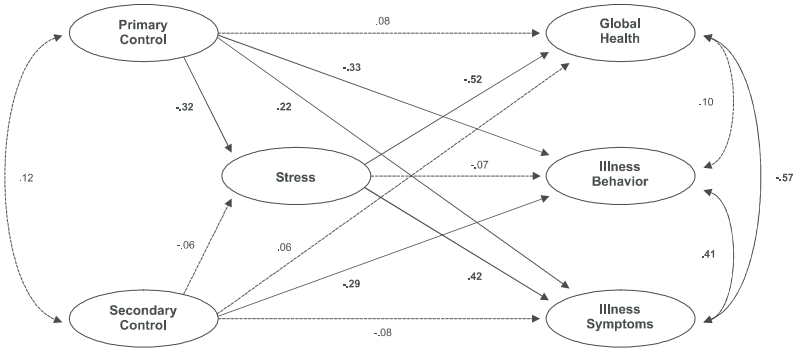

Figure 1. Structural equation modeling of primary and secondary control on stress and self-rated for *male* college students ($n = 278$) controlling for first-semester academic performance (not included in figure). Fit indices: $\chi^2/df = 1.83$, CFI = 0.98, TLI = 0.98, RMSEA = 0.055. Paths with bolded numbers and solid lines are statistically significant, $p < 0.05$. Paths with dotted lines and numbers not in bold are not statistically significant.

test revealed that the parameter estimates for these paths did significantly differ according to gender, $\chi^2(11) = 22.91$, $p < 0.05$. This finding is consistent with previous research showing significant gender differences in how primary- and secondary-control strategies predict subsequent health outcomes (Chipperfield et al., 1999, 2006; Chipperfield & Perry, 2006). Second, an omnibus multiple-group analysis of all item loadings (measurement model) also revealed a significant difference between male and female students, $\chi^2(26) = 54.58$, $p = 0.001$. However, follow-up chi-squared difference tests conducted for each latent construct revealed significant gender differences only for the three health measures, namely global self-rated health, $\chi^2(1) = 4.56$, $p = 0.033$, illness-related behaviors, $\chi^2(1) = 6.35$, $p = 0.012$, and illness symptoms, $\chi^2(7) = 16.10$, $p = 0.024$, and not for primary control, $\chi^2(9) = 16.78$, secondary control, $\chi^2(3) = 3.67$, or perceived stress, $\chi^2(5) = 6.81$.

Concerning global health, it was found that the self-rated *physical* health item was more strongly related to the latent self-rated global health factor in females (0.69) than in males (0.46), whereas the *psychological* health item was strongly related to global health for both females (0.70) and males (0.80). For illness-related behaviors, the item involving physician visits was better predicted by the latent factor for males (0.65) than for females (0.32), whereas the missed classes item better represented illness behaviors for females (0.59) than for males (0.27). Finally, although the illness symptoms items were found to consistently load higher on the latent factor for female students, item-loading discrepancies did not exceed 0.07 (e.g., male/female: sleep problems = 0.39/0.46; muscle tension = 0.53/0.60; fatigue = 0.66/0.73). As described in the Discussion section, these results are likely due to inaccurate reporting of perceived health and illness symptoms among males (Davies et al., 2000), as well as female students' greater likelihood to treat illness symptoms at home (i.e., missed classes; Green, 1990) and visit a physician for non-illness-related issues (i.e., birth control). Taken together, the significant multiple-group analyses on the structural model and, to a lesser extent, the measurement model are consistent with previous research on primary/secondary control and college student

health and provide empirical support for testing our analytical model for male and female students separately.

Male students. A good fit between our theoretical model and the data was found for male college students (see Figure 1). Primary control was negatively related to self-reported illness behavior ($\beta = -0.33$, $p < 0.05$) and perceived stress ($\beta = -0.32$, $p < 0.001$). Perceived stress, in turn, was negatively related to global health status ($\beta = -0.52$, $p < 0.001$) and positively associated with illness symptoms ($\beta = 0.42$, $p < 0.001$). These results, in combination with the non-significant direct path from primary control to global health, suggest that for male college students, the relationship between primary control and overall global self-rated health is largely mediated by the stress-deterrent nature of this primary-control approach.

The relationship found between primary control and illness symptoms, however, was more complex, as illustrated in Figure 1. Although primary control was found to indirectly relate to fewer symptoms through lower stress levels, the direct relationship from primary control to illness symptoms was, in fact, positive ($\beta = 0.22$, $p = 0.05$). These results indicate that for male college students, primary control may have both a positive and a negative effect on the reported frequency of illness symptoms, the former due to the stress-deterrent nature of this control process and the latter likely due to trait-like level of causal search associated with primary-control beliefs (see Discussion). Moreover, when this model was subsequently assessed for male students with the stress variable removed, the effect of primary control on illness symptoms was null ($\beta = 0.01$, NS).

A direct negative relationship between secondary control and illness-related behaviors was also observed for male students ($\beta = -0.29$, $p = 0.05$). Thus, although primary control was found to benefit males' global health and illness symptoms *indirectly* through the mediating influence of perceived stress, both primary and secondary control corresponded *directly* to lower levels of self-reported illness behavior for these individuals. These findings suggest that while reduced stress may be responsible for the positive effects of primary control on health perceptions for male students, primary and secondary control do not need to reduce stress in order to benefit more objective ratings of illness behaviors. This disconnect between the perception- and behavior-based outcomes for male students is further evidenced by a nonsignificant correlation between global health and illness behavior. Finally, primary and secondary control were not significantly interrelated for male students ($r[278] = 0.12$, $p = 0.16$), and the background performance variable predicted only primary control levels ($\beta = 0.21$, $p < 0.05$).

Female students. Our theoretical model also attained a good fit for female college students as depicted in Figure 2. In contrast to the results for male students, fewer significant paths were observed. Although the paths from primary control to the stress and health measures were in the expected directions, these relationships were not statistically significant at $p < 0.05$. Secondary control, however, was found to have strong indirect effects on the more perception-based health outcomes in females, with secondary control predicting lower perceived stress ($\beta = -0.17$, $p < 0.01$), which in turn, corresponded to better levels of overall self-rated global health ($\beta = -0.39$, $p < 0.001$) and illness symptoms ($\beta = 0.57$, $p < 0.001$). The mediational role of perceived stress in the relationship between secondary control and self-rated health in females is further highlighted by the lack of significant direct effects of secondary control on these dependent measures. Consistent with the aforementioned correlational analyses for the entire sample, all correlations in the model were

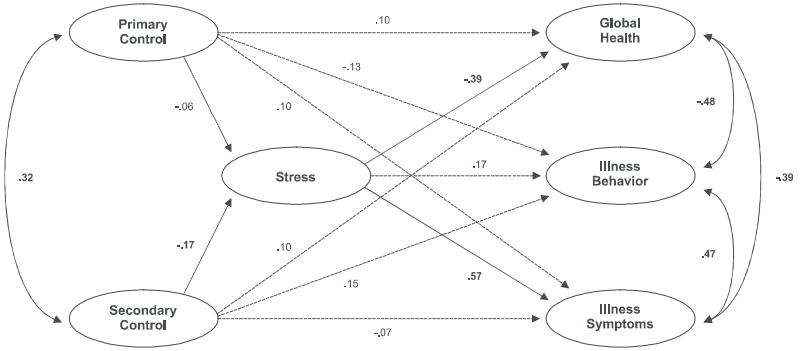

Figure 2. Structural equation modeling of primary and secondary control on stress and self-rated for *female* college students ($n = 575$) controlling for first-semester academic performance (not included in figure). Fit indices: $\chi^2/df = 2.24$, CFI = 0.99, TLI = 0.99, RMSEA = 0.046. Paths with bolded numbers and solid lines are statistically significant, $p < 0.05$. Paths with dotted lines and numbers not in bold are not statistically significant.

significant, as were the effects of test performance on primary control ($\beta = 0.22$, $p < 0.001$), secondary control ($\beta = -0.25$, $p < 0.001$), perceived stress ($\beta = -0.16$, $p < 0.05$), and health behaviors ($\beta = -0.22$, $p = 0.09$). Thus, only secondary control was found to significantly predict better self-reported health outcomes in female students, and unlike their male counterparts, in an indirect manner via the mediating influence of perceived stress.

Discussion

During the first year of college, freshman students experience a number of academic, social, and personal stressors that can threaten their sense of personal control and negatively impact their psychological and physical well-being (Damush et al., 1997; Hudd et al., 2000; Lumley & Provenzano, 2003; Perry, Hall, & Ruthig, 2005). The results of the present study provide empirical support for the applicability of Rothbaum et al.'s (1982) dual process model of control in examining how college students adjust during this challenging and often stressful academic transition phase, and more specifically, how primary and secondary control influence perceptions of stress and self-rated health in both male and female students. Moreover, these findings underscore the differential health benefits of primary and secondary academic control based on students' gender, and the importance of examining the mediating influence of perceived stress on the relationship between these control processes and self-reported health outcomes for both male and female students.

Through the use of structural equation modeling, the present study provides data in support of previous research in achievement motivation demonstrating the potential benefits of primary control for the academic development of college students (for reviews see Perry, 1991, 2003). For male college students, primary control was found to correspond to lower feelings of stress, greater perceptions of physical and psychological health, and fewer illness-related behaviors (i.e., missed classes, physician visits). This study is unique,

however, in suggesting health benefits of secondary control in college-aged individuals undergoing a common, albeit stressful, transition phase. In contrast, previous research in health psychology has focused mainly on the benefits of secondary control for individuals suffering from truly "low-control" health problems such as HIV (Thompson et al., 1994) and cancer (Thompson et al., 1993). In our study, students' ability to reinterpret negative academic events in a positive manner was indirectly related to higher levels of self-reported overall global health and lower reported frequency of everyday illness symptoms for females, as well as fewer illness-related behaviors for males by the end of the academic year.

These findings concerning the health benefits of interpretive secondary control parallel those of Jorgensen, Frankowski, and Carey (1999), who examined how a related construct "sense of coherence" (SOC) corresponded with self-rated health in college students. These authors found that students' sense of coherence buffered the negative impact of stress in that students who tended to perceive aversive or difficult life events as meaningful challenges were better able to focus on understanding and managing their health problems (concerning the health benefits of SOC for females in non-academic samples see Denton et al., 2004). Similarly, following her analysis of the determinants of health-promoting lifestyles in college students, Larouche (1998) noted the importance of encouraging students "to learn to let go of things beyond their control" (p. 42) in order to prevent feeling overwhelmed by negative academic experiences. Thus, although the present study represents an initial attempt at applying Rothbaum et al.'s (1982) dual-process model of perceived control to health in college students, these findings are consistent with existing research on self-rated health in the college setting and underscore the importance of not only primary-control beliefs, involving persistence and effort, but also students' ability to reinterpret stressful academic events as potential learning experiences (i.e., interpretive secondary control).

Gender-specific health implications of primary and secondary control

The present findings highlight the significance of considering gender differences when assessing the impact of primary and secondary control on students' health. For male students, results suggested that the benefits of primary control were for perceptions of overall health and illness symptoms, albeit indirectly through lower stress levels, and on more objective self-reports of illness-related behaviors such as missed classes and physician visits. Although similar results were found for females, these results did not reach statistical significance. Instead, the potential advantages of interpretive secondary control were observed primarily for female students, namely the indirect effects of secondary control on overall health assessments and symptom reports through lowered stress levels.

Secondary control was also negatively related to self-reported illness-related behaviors in male students. However, unlike their female counterparts, this effect was not due to the stress-reducing nature of secondary control. In fact, the positive influence of both primary and secondary control on health behaviors for males was found independent of the effect of these control processes on perceived stress. Thus, consistent with the gender differences observed in other studies (Chipperfield et al., 1999, 2006; Chipperfield & Perry, 2006), our findings showed that although secondary control positively predicted health for both male and female students, only the paths from secondary control were significant for females and primary control had stronger effects for males. Further, these results also demonstrated that the indirect effects of primary and secondary control on health through stress were found only for the more subjective health outcomes (i.e., perceived overall health and illness symptoms), whereas only direct effects on the behavior-based self-report measures were

observed for males. Perhaps for male students, underlying cognitive or motivational processes, as opposed to reductions in stress, are responsible for the health benefits found with regard to illness behaviors.

In understanding the lack of significant results for secondary control on measures of global health and illness symptoms for male students, and for females concerning behavioral indicators of ill health, it is important to consider the influence of gender-specific response biases in students' self-reported health. Based on previous research on self-rated health in college students, it is possible that women were more accurate when responding to the two dependent measures involving health-related self-awareness because they were more sensitive to changes in their health as well as more knowledgeable in terms of recognizing illness symptoms (Larouche, 1998; Shifren & Bauserman, 1996; Vingilis et al., 1998; Wade et al., 2000). Conversely, it is also possible that male students under-reported their health problems and overstated their overall health status relative to females because of social desirability factors and adherence to masculine norms, such as concealing vulnerability and not seeking assistance prematurely (Baffi et al., 1991; Davies et al., 2000). The main findings of this study are consistent with these interpretations, and are further supported by the preliminary gender difference analyses showing greater variability in females for perceived stress and each health outcome assessed (see Table I).

Concerning self-reported illness behaviors, it is possible that some female students may have reported greater use of health care services than males as a result of including non-illness-related physician visits for reproductive purposes (e.g., birth control, check-ups). In addition, some females may also have missed more classes than males due to a greater likelihood of home treatment of illness symptoms (i.e., self-medication; Green, 1990), symptoms that are also more frequently recognized by female students. As such, despite relatively equal variability in illness behaviors among females relative to males (SD = 0.76 and 0.70, respectively), the lack of significant paths from primary and secondary control to illness behaviors for females may have been due to a greater prevalence of self-care behaviors in females, which would decrease their need for *illness-related* physician visits relative to male students. In contrast, these results suggest that, for male college students measures requiring self-reports of actual health-related behaviors (e.g., physician visits, missed classes, exercise, injury, smoking, alcohol abuse, condom use, diet, seat belt use, etc.) may be most suitable for assessing the health-related impact of more subtle psychological constructs, such as interpretive secondary control, in male college students, due to such measures being less subject to response bias.

Control and health in students: The mediating role of perceived stress

In addition to examining the influence of primary and secondary control on self-rated health in first-year college students, the present study is also unique in examining the potential mediational role played by students' perceptions of stress. Based on previous research demonstrating the importance of college students' stress as a salient predictor of self-rated health (e.g., Bernard & Belinsky, 1993; Damush et al., 1997; Hemenover & Dienstbier, 1998; Hudd et al., 2000; Robbins et al., 1991) and the stress-reducing nature of both primary and secondary control (e.g., Connor-Smith & Compas, 2002; Thompson et al., 1993, 1996; Wadsworth & Compas, 2002), our study provides encouraging results concerning the positive indirect effects of primary and secondary control on health through lower levels of perceived stress. For example, among female college students, the positive influence of secondary control on overall self-rated health and illness symptoms was mainly due to the stress-reducing effects of this control process. That is, secondary control

corresponded with lower stress in females, which in turn, resulted in higher reported levels of global health and lower reporting of illness symptoms. For male students, the benefits of primary control for global health and illness symptoms were also found to be due to its stress-reducing nature, with primary control contributing to fewer symptoms reported and greater overall health status only indirectly through its positive influence on perceptions of stress. In this manner, these findings contribute significantly to the research literatures on both primary/secondary control as well as college student health in highlighting perceived stress as an important mechanism underlying the health benefits of primary and secondary control.

In addition to these results, a very intriguing finding also emerged for male students such that, although primary control had a negative relationship with reported symptoms indirectly through lower levels of perceived stress, primary control was also found to correspond with higher symptom reporting when its stress-reducing qualities were controlled for. Primary control was also found to directly predict greater reporting of illness symptoms for females; however, this path did not reach statistical significance ($\beta = 0.10$, $p = 0.09$). As such, this study found that for male college students, primary control had both an indirect positive as well as a direct negative relationship with illness symptoms; opposite effects which cancel each other out when students' perceptions of stress are not controlled for (see non-significant correlation in Table II).

Although the positive relationship between primary control and symptom reporting may appear counterintuitive, one possible explanation for this finding involves the potential health costs of primary-control striving in a competitive academic achievement setting. More specifically, because students with high primary control invest more effort and are more persistent in their studies than low-primary-control students, they may also experience more illness symptoms such as headaches, lack of sleep, and muscle tension due to the physical toll taken by this hard-driving approach. Thus, although primary control may lead to reduced stress in male students which, in turn, leads to fewer symptoms reported, the physical and psychological exertion required to maintain effective study strategies and good grades through primary control may independently contribute to more symptom reporting.

However, this finding could also be explained by considering primary-control beliefs in the context of perceived controllability as outlined in Weiner's Attribution Theory (1985, 1995). According to Weiner, causal search occurs when an individual is faced with an important, negative, or unexpected event and results in a causal ascription, which can be classified according to its perceived controllability (e.g., effort attribution = high control). College students high in primary control can be considered as having an "attributional style" characterized by consistent attributions to effort and persistence (cf., Garber & Seligman, 1980), and are assumed to engage in considerable causal search in order to sustain their trait-like sense of academic control over time (see Independent measures for test – retest reliability). Hence, it is possible that students high in primary control frequently engaged in causal search concerning factors related not only to academic performance (e.g., professor, course load, class attendance, time spent studying), but also to their general well-being and physical health (e.g., headaches, sleep problems, etc.). Although primary control contributed to decreased symptom reporting through its beneficial effects on stress, primary control may have resulted in more reported illness symptoms when this relationship was controlled for, because high-control students were also more inclined to engage in causal search concerning their health problems. Regardless of the interpretation, this intriguing finding serves to further illustrate the importance of considering perceived stress as a

potential mediator of the effects of primary and secondary control on self-reported health in that only by accounting for this important underlying mechanism can the effects of these control processes on health be accurately and fully examined.

Strengths and limitations

The present study contributes to the research literature in primary and secondary control in several ways. First, this study represents an initial application of Rothbaum et al.'s (1982) model of control to the study of how *young* adults sustain their physical health and well-being during the transition from high school to college, and further, highlights the importance of both control processes for this underinvestigated demographic in research on secondary control (age 17–24 years of age). Second, the present two-phase study was conducted over the course of an entire academic year, allowing us to more fully assess the longitudinal impact of first-semester levels of control and perceived stress on end-of-year indicators of health status.

Third, this study utilized academic-oriented measures of both primary and secondary control to provide a domain-specific assessment student's control beliefs and strategies, and also assessed multiple facets of students' self-rated health including global health status, as well as frequency of illness symptoms and illness-related behaviors. Fourth, through the use of structural equation modeling, the present research examined not only the moderating influence of gender, but also the mediational influence of perceived stress—a dual-focused approach that allowed us to more fully explore how primary and secondary control affect student health. Finally, because preliminary analyses showed few differences in study attrition on key variables, and main analyses included students' actual performance as a covariate, we can be confident that our findings are not due to the confounding influence of academic achievement or contaminated by selective dropout.

In addition to these strengths, two limitations should be considered when interpreting our results. First, because the measures of primary and secondary control as well as perceived stress were assessed during the first study phase, reverse and bidirectional causality involving these measures are possible (see note 2). Moreover, with our study having assessed the primary/secondary control and stress measures at Time 1 and health outcomes at Time 2, the reverse effects of health and illness on control and stress, as well as the relative magnitude of these effects, could not be examined. Thus, although this study employed a longitudinal design consistent with the directional paths included in our analytical model, the assessment of control and stress at Time 1 and health measures at Time 2 does not preclude the possibility that reverse effects and reciprocal causation may have influenced the present results.

The second limitation of this study concerns the common method variance associated with our exclusive use of self-report measures to assess key study variables. More specifically, the observed interrelationships between these constructs may be artificially inflated because all were assessed using the same questionnaire method. It is important to note, however, that self-report measures do provide an appropriate method for assessing the control- and stress-related cognitions examined in the present study, namely primary control beliefs, general perceptions of stress, and secondary control strategies involving positive reappraisal. Global self-evaluations of health have also been found to predict morbidity, hospitalization, and mortality better than less subjective health indicators such as chronic health conditions (e.g., Menec & Chipperfield, 2001; for review see Idler & Benyamini, 1997). Nonetheless, future studies examining the influence of primary and

secondary control on student health with regard to objective health measures such as blood pressure, physical activity, or physician diagnoses are recommended.

Enhancing primary and secondary control in college students

Aside from theoretical contributions of this study, these results are also of significant practical importance considering that health problems arising in early adulthood can lead to more serious health issues (e.g., heart disease, Spencer, 2002; sleep disorders, Buboltz et al., 2001). Thus, by determining the nature of the relationship between primary and secondary control and self-rated health in a college student population, it may be possible for low-risk/low-cost preventative measures to be implemented before health problems become more severe in later life. Concerning the specific nature of potential health-related intervention techniques for college students, research on college student health suggests that improvements in health may be achieved by encouraging perceptions of personal control and responsibility in students concerning their academic experiences (Davies et al., 2000; Larouche, 1998). Further, Jorgensen et al. (1999) suggest that treatments should also serve to encourage students to view their health problems in a more meaningful way. Relating these suggestions to primary and secondary control, predictability has long been considered a central component of primary academic control (see Perry, 1991), and reinterpreting negative events in a more meaningful manner was proposed by Rothbaum et al. (1982) as the common factor underlying phenotypically dissimilar attempts at secondary control.

One potentially effective remedial intervention technique, attributional retraining, encourages students to focus on the controllable aspects of their academic experience. This treatment has proven effective in increasing academic performance in young adults (Hall, Hladkyj, Perry, & Ruthig, 2004; for reviews see Perry, Hechter, Menec, & Weinberg, 1993, and Perry et al., 2005) and improving health status in older adults (Weinberg, 2001). Intervention techniques fostering both primary and secondary control in at-risk individuals have also been encouraged in perceived control research (Thompson et al., 1993; Weisz, Rothbaum, & Blackburn, 1984), specifically treatments which facilitate the use of primary control as well as interpretive secondary-control strategies, such as finding benefit in an adverse experience (Connor-Smith & Compas, 2002; Langrock et al., 2002; Thompson et al., 1994). Recent research has found such treatment methods to be an effective means of enhancing both primary *and* secondary control in failure-prone college students (Hall, Perry, Chipperfield, et al., 2006), as well as adolescents with health problems (Weisz, Thurber, Sweeney, Proffitt, & LeGagnoux, 1997). Thus, future research assessing the impact of attributional retraining procedures on the college student health is warranted, and may be serve to help these individuals assume greater personal control over their psychological and physical well-being.

Notes

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1 The constructs of primary and secondary control as represented by the strategies of persistence and positive reappraisal, respectively, are directly consistent with the well-known coping taxonomy of problem- and emotion-focused coping outlined by Lazarus and Folkman (1984). Whereas problem-focused coping strategies involve active efforts to alter the source of stress (e.g., initiation of direct action, increased effort), emotion-focused coping strategies are aimed at reducing the emotional distress caused by the stressor (e.g., reconstruing the situation in positive terms). The primary/secondary control framework was adopted for the present study based in part on research on coping in adolescence conducted by Compas and colleagues in which this terminology is increasingly employed (e.g., Connor-Smith & Calvete, 2004; Wadsworth & Compas, 2002). For a comprehensive review and comparison of these and related coping classification systems, see Skinner, Edge, Altman, and Sherwood (2003). For an attributional perspective on the conceptual links between causal attributions, coping, and perceived control, a meta-analytic review of the relations between these constructs and psychological adjustment is provided by Roesch and Weiner (2001).

2 Recent coping research on primary/secondary control and anxiety has also assessed these control constructs as mediators of the effect of stress on subsequent adjustment (e.g., Connor-Smith & Compas, 2002; Langrock et al., 2002; Wadsworth & Compas, 2002), with results suggesting that those higher in stress are less likely to engage in primary and secondary control than their low-stress counterparts. Because this assertion is inconsistent with other theoretical and empirical work highlighting the effectiveness of secondary control particularly in stressful or low-control circumstances (e.g., Chipperfield et al., 1999; Heckhausen & Schulz, 1995; Thompson, 1993, 2002; Thompson et al., 1998), and studies showing lower levels of anxiety resulting from primary and secondary control (see Primary/secondary control research section), the present study assessed perceived stress as a mediating process underlying the health benefits of these control processes. This approach is also consistent with research on stress and health in college students that presents anxiety as mediating the relationship between cognitive appraisals of stressors (i.e., controllability) and subsequent health status (e.g., Bennett & Elliott, 2002; Hemenover & Dienstbier, 1998). Nonetheless, it is important to note that because our measures of control and stress were administered at the same time, alternate directions of causality (e.g., stress to control, bidirectional) cannot be ruled out.

3 According to Rothbaum et al. (1982), secondary control is hypothesized to consist of four distinct dimensions including predictive, illusory, vicarious, and interpretive control. Prediction enables one to avoid disappointment by attributing potential failure experiences to limited ability, whereas construing luck as a personal attribute, not unlike ability, can provide an illusory sense of control. Similarly, identification with powerful others permits vicarious control, and interpretive control is achieved through construing meaning in one's situational limitations.

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Appendix

Interpretive Secondary Academic Control Scale

Item		Mean	SD	Item-to-total correlation
1.	My academic performance and experience has given me a deeper understanding of my life than could be achieved without this experience.	3.54	0.94	0.31
2.	Regardless of what my grades are, I try to appreciate how my university experience can make me a "stronger person" overall.	3.51	1.03	0.51
3.	No matter how well I do on a test or in a course, I try to "see beyond" my grades to how my experience at university helps me to learn about myself.	2.91	1.01	0.49
4.	Whenever I have a bad experience at university, I try to see how I can "turn it around" and benefit from it.	3.43	1.02	0.39
Scale total		13.38	2.78	$\alpha = 0.64$